

Tab A

Pre-Amendment Application Claim 48 (Rejected)	Issued Claim 4 After Narrowing Amendment
<p>48. A method of utilizing a compressor of a gas turbine engine to power pneumatically-operated apparatus having a variable inlet air flow demand, said method comprising the steps of:</p> <p>(a) interconnecting a supply duct between the compressor and the pneumatically-operated apparatus;</p> <p>(b) flowing discharge air from the compressor through said supply duct to the pneumatically-operated apparatus; and</p> <p>(c) maintaining an essentially constant minimum supply duct flow rate, despite fluctuations in the flow rate of air received by the pneumatically-operated apparatus, by exhausting air from said supply duct in response to variations therein of the value of predetermined, flow-related parameter, the flow rate of air exhausted from said supply duct being related to the magnitude of said parameter value variations in both a proportional and time-integral manner.</p>	<p>4. A method of utilizing a compressor of a gas turbine engine to power pneumatically-operated apparatus having a variable inlet air flow demand, <i>the compressor having adjustable inlet guide vanes</i>, said method comprising the steps of:</p> <p>(a) interconnecting a supply duct between the compressor and the pneumatically-operated apparatus;</p> <p>(b) flowing discharge air from the compressor through said supply duct to the pneumatically-operated apparatus;</p> <p>(c) maintaining an essentially constant minimum supply duct flow rate, despite fluctuations in the flow rate of air received by the pneumatically-operated apparatus, by exhausting air from said supply duct in response to variations therein of the value of <i>a</i> predetermined, flow-related parameter, the flow rate of air exhausted from said supply duct being related to the magnitude of said parameter value variations in both a proportional and time-integral manner,</p> <p><i>said maintaining step including the steps of providing an outlet passage from said supply duct, positioning in said outlet passage a surge bleed valve operable to selectively vary the flow of air outwardly through said outlet passage, generating an integral control signal in response to said variation in said flow-related parameter, generating a proportional control signal in response to said variations in said flow-related parameter, and simultaneously utilizing said integral and proportional control signals to operate said surge bleed valve; and</i></p> <p><i>(d) adjusting the relationship between the magnitudes of said integral and proportional control signals and the magnitudes of said parameter variations as a function of the position of the inlet guide vanes.</i></p>

Tab B

Pre-Amendment Application Claim 16 (Rejected)	Issued Claim 8 After Narrowing Amendment
<p>16. A gas turbine engine accessory power unit for supplying compressed air to pneumatically-powered apparatus having a fluctuating compressed air supply demand, said accessory power unit comprising:</p> <p>(a) a compressor;</p> <p>(b) duct means for receiving compressed air discharged from said compressor and supplying the received air to the pneumatically-powered apparatus;</p> <p>(c) surge bleed means operable to exhaust from said duct means a selectively variable quantity of air to assure at least a predetermined minimum flow rate through said duct means and thereby prevent surge of said compressor;</p> <p>(d) sensing means for sensing the value of a predetermined, flow-related parameter within said duct means and generating an output signal indicative of said value;</p> <p>(e) comparator means for receiving said sensing means output signal and generating an error signal representing the difference between the sensed value of said parameter and a desired value thereof; and</p> <p>(f) control means for receiving said error signal and transmitting to said surge bleed means a control signal to operate said surge bleed means, the magnitude of said control signal having, relative to the magnitude of said error signal, a proportional component and an integral component, whereby said minimum flow rate through said duct means is essentially constant regardless of the compressed air supply demand of the pneumatically-powered apparatus.</p>	<p>8. A gas turbine engine accessory power unit for supplying compressed air to pneumatically-powered apparatus having a fluctuating compressed air supply demand, said accessory power unit comprising:</p> <p>(a) a compressor <i>having adjustable inlet guide vanes</i>;</p> <p>(b) duct means for receiving compressed air discharged from said compressor and supplying the received air to the pneumatically-powered apparatus;</p> <p>(c) surge bleed means operable to exhaust from said duct means a selectively variable quantity of air to assure at least a predetermined minimum flow rate through said duct means and thereby prevent surge of said compressor;</p> <p>(d) sensing means for sensing the value of a predetermined, flow-related parameter within said duct means and generating an output signal indicative of said value, <i>said value of said flow-related parameter being substantially independent of the temperature of the compressed air</i>;</p> <p>(e) comparator means for receiving said sensing means output signal and generating an error signal representing the difference between the sensed value of said parameter and a desired value thereof, <i>and said comparator means having an adjustable control set point representing said desired value of said parameter</i>;</p> <p><i>(f) means for transmitting to said comparator means a reset signal for varying said set point as a function of the position of said inlet guide vanes in accordance with a predetermined reset schedule; and</i></p> <p>(g) control means for receiving said error signal and transmitting to said surge bleed means a control signal to operate said surge bleed means, the magnitude of said control signal having, relative to the magnitude of said error signal, a proportional component and an integral component, whereby said minimum flow rate through said duct means is essentially constant regardless of the compressed air supply demand of the pneumatically-powered apparatus.</p>

Tab C

Pre-Amendment Application Claim 32 (Rejected)	Issued Claim 19 After Narrowing Amendment
<p>32. A control system for assuring a substantially constant minimum flow rate through a duct receiving air discharged from a compressor or the like, the duct having a supply outlet connected to pneumatically-operated apparatus having a variable supply air demand, the duct further having an exhaust outlet, said control system comprising:</p> <p>(a) a flow regulating device adapted to be positioned in the exhaust outlet and operable to selectively vary air flow outwardly therethrough;</p> <p>(b) a flow sensing device having a sensing portion adapted to be positioned in the duct, said flow sensing device further having an output portion;</p> <p>(c) an adjustable set point comparator having an input portion coupled to said output portion of said flow sensor, and an outlet adapted to generate an error signal;</p> <p>(d) a proportional controller having an inlet coupled to said outlet of said comparator and further having an outlet;</p> <p>(e) an integral controller having an inlet coupled to said outlet of said comparator and further having an inlet; and</p> <p>(f) a summer having a first inlet coupled to said outlet of said proportional controller, a second inlet coupled to said outlet of said integral controller, and an outlet coupled to said flow regulator.</p>	<p>19. A control system for assuring a substantially constant minimum flow rate through a duct receiving air discharged from a compressor or the like <i>having adjustable inlet guide vanes</i>, the duct having a supply outlet connected to pneumatically-operated apparatus having a variable supply air demand, the duct further having an exhaust outlet, said control system comprising:</p> <p>(a) a flow regulating device adapted to be positioned in the exhaust outlet and operable to selectively vary air flow outwardly therethrough;</p> <p>(b) a flow sensing device having a sensing portion adapted to be positioned in the duct <i>to sense therein a predetermined parameter related to the air flow rate through the duct</i>, said flow sensing device further having an output portion;</p> <p>(c) an adjustable set point comparator having an input portion coupled to said output portion of said flow sensor <i>sensing device</i>, and an outlet adapted to generate an error signal;</p> <p>(d) a proportional controller having an inlet coupled to said output of said comparator and further having an outlet;</p> <p>(e) an integral controller having an inlet coupled to said outlet of said comparator and further having an inlet <i>outlet</i>;</p> <p>(f) a summer having a first inlet coupled to said outlet of said proportional controller, a second inlet coupled to said outlet of said integral controller, and an outlet coupled to said flow regulator <i>regulating device; and</i></p> <p><i>(g) a guide vane position sensor and a function generator coupled in series between the inlet guide vanes and said input portion of said comparator.</i></p>